

**REMARKS**

Claim 1 has been amended to address the language objection, and also to better define the instant invention over the prior art. Claim 15 has been rewritten in independent form. No new matter has been entered.

Turning to the rejection of claims 1 and 5 under 35 USC § 103 as obvious over Yamada et al. (U.S. Patent No. 6,466,296) in view of Rho et al. (U.S. Patent No. 6,057,896), claim 1 has been amended to specify that the first recess has a bottom portion in which a pixel electrode contacts a passivation layer. As the Examiner acknowledges, Yamada et al. does not teach "a first substrate including a pixel electrode provided for each pixel, and a driving element provided for each of said pixel electrodes; a second substrate disposed opposite to said first substrate and including an opposite electrode; and a liquid crystal layer sandwiched between a first substrate and a second substrate, wherein said pixel electrode has a first recess in a groove shape, formed therein which fixes a boundary between said two pixel regions, wherein said pixel electrode is continuously formed across said recess, and a second recess for connecting the pixel electrode to the source electrode of an associated TFT." (Detailed Action, p. 3). Since, according to the Examiner, Yamada et al. does not teach the pixel electrode of claim 1, Yamada et al. also cannot teach that such electrode contacts the passivation layer within the first recess. Furthermore, Rho et al. does not supply the missing teachings. Rho et al. teaches a contact hole 120 with a pixel electrode 140 formed in a recess, wherein the pixel electrode formed in the bottom portion of the recess is in contact with a gate insulating layer 40 (FIG. 3). Rho et al. does not teach a recess that has a bottom electrode in which the pixel electrode

HAYES SOLOWAY P.C.  
130 W. CUSHING ST.  
TUCSON, AZ 85701  
TEL. 520.882.7623  
FAX. 520.882.7643

175 CANAL STREET  
MANCHESTER, NH 03101  
TEL. 603.668.1400  
FAX. 603.668.8567

contacts the passivation layer. Thus, no combination of Yamada et al. and Rho et al. can achieve or render obvious claim 1 or claim 5, which depends thereon.

Accordingly, the rejection of claims 1 and 5 as obvious over a combination of references including Yamada et al., cannot be maintained.

Turning to the rejection of claims 1, 2, 7-9, 18 and 19 under 35 USC §103 as obvious over Tokuo (Japanese Patent Abstract Publication No. 07-311383) in view of Rho et al., claim 1 has been amended to specify that the “first recess has a bottom portion in which said pixel electrode contacts a passivation layer.” Rho et al. teaches a contact hole 120 with a pixel electrode 140 formed in a recess, wherein the pixel electrode formed in a bottom portion of the recess in contact with gate insulating layer 40 (FIG. 3). Rho et al. does not teach a recess portion in which the bottom of the recess portion has a pixel electrode in contact with a passivation film as required by claim 1. Furthermore, Tokuo does not supply the missing teachings. Tokuo teaches a transparent electrode 101 with a completely formed through electrode 101 (FIG. 9). Tokuo does not teach a recess having a bottom portion in which the pixel electrode is in contact with a passivation film. Thus, no combination of Tokuo and Rho et al. can achieve or render obvious claim 1 or claim 2, or claims 7-9, which depend directly or indirectly thereon.

The Examiner also rejected the several claims as obvious from various art combinations based on Rho et al. or Tokuo or combinations of them with secondary art, including: (1) Tokuo in view of Rho et al. (claims 1,2,7-9, 18 and 19); (2) Tokuo in view of Rho et al. as applied to claims 1 and 2 (claims 3 and 4); (3) Tokuo in view of Rho et al. as applied to claims 1 and 2, and further in view of Lyu et al. (U.S. Pub. No. 2002/0021400) (claims 16 and 17); (4) Tokuo

HAYES SOLOWAY P.C.  
130 W. CUSHING ST.  
TUCSON, AZ 85701  
TEL. 520.882.7623  
FAX. 520.882.7643

175 CANAL STREET  
MANCHESTER, NH 03101  
TEL. 603.668.1400  
FAX. 603.668.8567

in view of Rho et al. as applied to claims 18 and 19, and in further view of Shimizu et al. (U.S. Patent No. 6,431,002) (claims 20 and 21); (5) Tokuo in view of Rho et al. as applied to claim 2, and further in view of Yoshida et al. (U.S. Patent No. 6,222,599) (claim 10); (6) Rho et al. as applied to claim 1, and further in view of Tokuo (claims 2, 6, 9 and 14); (7) Rho et al. as applied to claim 1 (claim 3); and (8) Tokuo as applied to claims 1 and 2 in view of the Admitted Prior Art (APA) (claim 13). These rejections also are improper.

None of the secondary references provides the missing teachings to Rho et al. and/or Tokuo: Lyu et al. deals with optical properties of liquid crystals; Shimizu et al. teaches the proper twist angles for the liquid crystals; Yoshida et al. staggers the positions of the electrodes on the second substrate. None of these references or the APA teaches having two recesses in the pixel electrode, using one to divide the pixel electrode located in the bottom portion of the first recess or that the pixel region is in contact with a passivation layer.

Finally, turning to the rejection of claims 1 and 5 under 35 USC 103(a) as being unpatentable over the APA in view of Hirata et al. (U.S. Patent No. 6,141,077), the Examiner admits that APA does not teach a pixel electrode with recesses in a groove shape (Detailed Action, page 16, lines 4-5). Hirata et al. teaches using bumps of different height to improve viewing angle characteristics. While the bump patterns can stretch across more than one pixel in Hirata et al., the recesses do not act as a boundary line. (See Example 2 in col. 10-11.) The purpose of the bumps and recesses is to improve the view angle, not to divide two pixels. Furthermore, Hirata et al. teaches a bottom recess portion having a pixel electrode formed therein, where the pixel electrode is in contact with a substrate (FIG. 7). Hirata et al. does not teach a recess with a pixel electrode formed in a bottom portion of said recess, said pixel

HAYES SOLOWAY P.C.  
130 W. CUSHING ST.  
TUCSON, AZ 85701  
TEL. 520.882.7623  
FAX. 520.882.7643

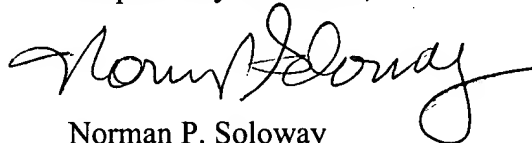
175 CANAL STREET  
MANCHESTER, NH 03101  
TEL. 603.668.1400  
FAX. 603.668.8567

electrode in contact with the passivation layer. Thus, no combination of the APA and Hirata et al. can teach or render obvious claim 1, or claim 5 which depends thereon.

It is believed therefore, the Application now is in order for allowance. Early and favorable action are respectfully requested.

A credit card authorization Form PTO authorizing a charge in the amount of \$84.00 for the added independent claim fee accompanies this Amendment. In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account No. 08-1391.

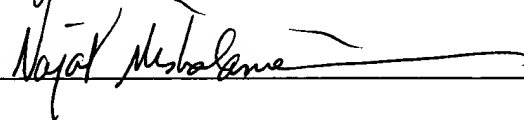
Respectfully submitted,



Norman P. Soloway  
Attorney for Applicants  
Reg. No. 24,315

**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on July 11, 2003, at Tucson, Arizona.

By 

NPS/ALK:nm

HAYES SOLOWAY P.C.  
130 W. CUSHING ST.  
TUCSON, AZ 85701  
TEL. 520.882.7623  
FAX. 520.882.7643

175 CANAL STREET  
MANCHESTER, NH 03101  
TEL. 603.668.1400  
FAX. 603.668.8567